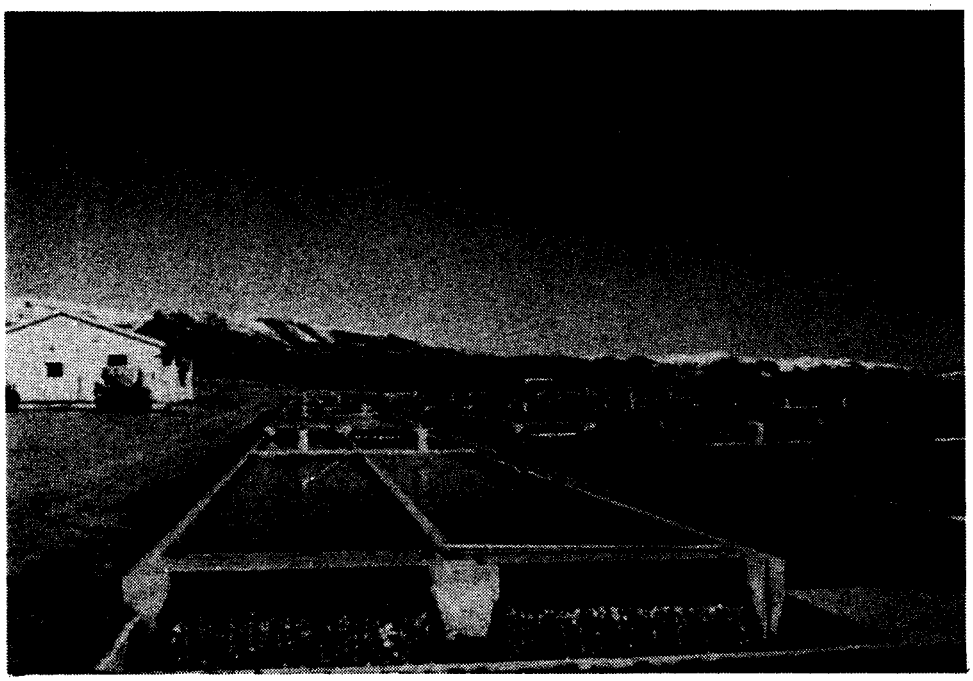
MACKAY HATCHERY
ANNUAL REPORT

October 1, 1985 to September 30, 1986



by
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Fish Hatchery Superintendent II

December 1986

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ABSTRACT

Mackay Hatchery is currently assigned specialty status with emphasis on resident catchable, fingerling and fry production for statewide distribution.

Production at the Mackay Hatchery for the year of October 1, 1985 to September 30, 1986 included:

1. 115,000 (38,000 lb) Mt. Lassen rainbow trout catchables,
2. 80,000 (1,700 lb) Mt. Shasta rainbow trout fingerlings,
3. 155,000 (1,300 lb) Eagle Lake rainbow trout fry and fingerlings,
4. 181,000 (1,700 lb) Lake McConaughy rainbow trout .fry and fingerlings,
5. 885,000 (5,000 lb) Henrys Lake cutthroat trout fry,
6. 472,000 (5,500 lb) brown trout fry and fingerlings,
7. 100,000 (2,000 lb) fall chinook salmon fingerlings, and
8. 1,673,000 (35,000 lb) coho salmon fingerlings.

At the beginning of the fish year, 119,740 rainbow trout weighing 3,726 lb were on hand. Total Mackay Hatchery fish planted or transferred numbered 3,362,194 and weighed 90,267 lb. A total of 154,848 fish weighing 17,260 lb were on hand at the end of the fish year, bringing total production to 3,697,302 fish weighing 100,851 lb.

A total of 112,197 lb of fish feed was utilized at a cost of $23,188.96. A feed conversion of 1.113 was attained, and feed cost per pound of fish produced was 0.2299 cents. When all hatchery costs (except capital outlay) were included, each pound of fish produced required an expenditure of $1.03.

Fifty-six high mountain lakes in Region 6 were planted with rainbow and cutthroat fry.

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INTRODUCTION

Mackay Hatchery is a state-owned and operated facility located 12 miles northwest of the town of Mackay in Custer County, Idaho. It is situated in a high desert plateau at an elevation of nearly 6,300 ft. The hatchery is arranged in a somewhat unique "closed system" in that water rises from springs on the hatchery grounds and after leaving the hatchery, water gradually sinks back into the ground as part of the Lost River Sinks. After leaving the hatchery effluent settling pond, the hatchery water becomes Warm Springs Creek. During the irrigation season (May to October), this creek is often completely dewatered within a mile downstream of this hatchery.

Since the earthquake of 1983, the water rises in 3 springs with water temperatures of 52ºF, 54ºF and 56ºF. Water flows fluctuate seasonally from 16 to 22 cfs. The water comes from the ground at 1 to 3 parts ppm of oxygen, and most is routed through packed-column aerators, which bring oxygen levels up to 7+ ppm.

Staffing consists of a manager, assistant manager, a five-month Bio-Aide and a six-month Bio-Aide. A Fish Culturist position was borrowed temporarily in 1983 when that PCN was needed to create an office position.

The physical plant consists of a hatchery-office-laboratory building containing 14 Heath incubator stacks providing 210 incubation trays. During coho incubation, an additional 48 trays are installed over the rearing troughs to accommodate the additional eggs. Nursery space consists of 26 fiberglass nursery troughs, each 14.5 ft x 9.5 in deep and five 6-foot circular tanks. Nursery troughs purchased in 1966 are wearing out from daily cleaning. They are being replaced gradually. The building is supplied with 52°F water via a 12-in pipeline with a 24-in packed-column aerator on the intake.

Eight fry raceways, each 3 ft x 100 ft x 24 in deep, are supplied with 54°F water via a 14-in pipeline with an 18-in packed-column aerator on the intake of each raceway.

Eight production raceways, each 8 ft x 400 ft x 3 ft deep, are supplied with water via a 30-in pipeline and covered headrace. The production raceways can be operated with either of two different water supplies, or a mixture of the two. Five cubic feet per second of 56ºF water runs through six 48 in packed-column aerators and arrives at the raceways at 7.6 ppm oxygen. Ten cubic feet per second of water at 52ºF arrives at 5.6 ppm oxygen.

A 10 ft x 3 ft deep quarantine raceway is used to hold fish transferred here from other hatcheries prior to redistribution. Water to the quarantine raceway is supplied from the tailrace of the large raceways.

Limiting factors to production at the Mackay Hatchery include insufficient manpower to operate safely and efficiently. Increased water flow since the earthquake of 1983 would permit an expansion, but we cannot operate the expansion with our temporary understaffing.

The black-iron pipeline to the large raceways was constructed in 1951 and is probably in need of replacement. Other rearing facilities are continually maintained and are in good condition.

OBJECTIVES

Because of its specialty status, the objectives of Mackay Hatchery change from year to year, depending on management needs and specialty species egg availability. The objectives of the Mackay Hatchery for 1985 to 86 were:

1. To rear various species and strains of fry, fingerlings and catchables for distribution to various locations in 5 regions of Idaho. These included 530,000 rainbow trout of various strains, 800,000 cutthroat trout, 450,000 brown trout, 100,000 fall chinook salmon and 1,600,000 coho salmon.

2. To rear appropriate numbers of three different strains of rainbow trout for rainbow trout strain evaluation studies in Mormon, Horsethief and Ashton reservoirs.

3. To stock designated high mountain lakes in Region 6.

FISH PRODUCTION

Five species and nine strains of fish were raised at Mackay Hatchery this year, with percent survivals (live fish at release divided by eggs received) ranging from 55.6% to 91.5% (Table 1).

We planted or transferred 3,362,194 fish weighing 90,297 lb to waters and hatcheries in five regions of Idaho (Table 2). An additional 154,848 fish weighing 17,260 lb were on hand at the end of the fish year. We started the year with 119,740 fish weighing 3,726 lb, which brings net production to 100,851 lb.

Eggs and fry for our programs are received from various locations in the United States (Table 3).

Table 1. Fish production at Mackay Hatchery, October 1, 1985 to September 30, 1986.

Species	Lot number	Eggs received	Percent hatch	Fish received	Fish produced	Pounds produced
Rainbow trout	5UIdR416	0	-	36,960	29,532	6,614
	5UIdR406	0	-	103,840	109,608	36,317
	6UIdR416	0	-	10,010	10,000	15
	6-En-R5	313,442	82.3	0	224,395	13,987
	6-Ct-R6	260,309	96.2	0	155,775	1,346
	6-En-R7	326,875	96.6	0	181,875	1,697
Brown trout	6-U-Ut	162,961	96	0	144,200	1,644
	6-Y-Ma	367,588	98	0	328,520	3,795
Cutthroat trout	6UIdC3	1,039,420	97	0	884,600	5,072
	6UIdC316	0	-	9,982	9,959	23
Coho salmon	6-Wd	2,103,000	95.1	0	1,672,889	35,187
Fall chinook salmon	5UInFC	110,455	96.8	0	100,747	1,970

TABLE 2
FRY, FINGERLING, AND CATCHABLE PLANTS AND TRANSFERS
FROM MACKAY HATCHERY PRODUCTION FISH
OCTOBER 1, 1985 to SEPTEMBER 30,1986

SPECIES	STRAIN	RECEIVING WATERS	NUMBER	POUNDS	ION REG
FALL CHINOOK	GREAT LAKES	Chesterfield Res.	25,025	350	5
		Oakley Res.	15,275	235	4
		Salmon Falls Res.	20,312	325	4
		Mormon Res.	10,015	235	4
		Coeur d'Alene L.	30,030	825	1
COHO SALMON	COLUMBIA RIVER	Ririe Reservoir	100,800	1,050	6
		Cascade Res.	1,054,475	22,725	3
		Island Park Res.	509,550	11,300	6
		Sublett Res.	8,064	112	4
BROWN TROUT	SPRING CREEK	Sublett Res.	30,084	327	4
		Dog Cr. Res.	20,056	218	4
		Thorn Cr. Res.	5,060	55	4
		Billingsly Cr.	20,056	218	4
		Salmon Falls Res.	49,444	526	4
		Mormon Res.	19,500	300	4
	PLYMOUTH ROCK	Hagerman Hatchery	83,000	615	4
		Little Wood River	102,960	1,200	4
		Mormon Res.	60,960	780	4
		Big Lost River	81,600	1,200	6
CUTT. TROUT	HENRYS LAKE	Henrys Lake	836,600	5,000	6
		High Mtn. Lakes	48,000	72	6
RAINBOW TROUT	MOUNT LASSEN	Ashton Res.	4,970	1,567	6
		Local Plants (R43)	109,608	36,317	6
	MOUNT SHASTA	Mormon Res.	50,140	1,090	4
		Lost Valley Res.	29,670	645	3
	EAGLE LAKE	Mormon Res.	50,375	325	4
		Lost Valley Res.	37,500	250	3
		Ririe Reservoir	67,500	750	6
	McCONAUGHY	Mormon Res.	51,000	300	4
		Lost Valley Res.	25,500	150	3
		Capehorn Lake #2	2,125	25	6
		Ririe Reservoir	89,250	1,050	6
		Iron Lake	5,100	60	6
		Mackay Reservoir	8,500	100	6

TABLE 3
ORIGIN OF EGGS OR FISH RECEIVED AT MACKAY HATCHERY
OCTOBER 1, 1985 - SEPTEMBER 30. 1986

SPECIES	STRAIN	LOT NUMBER	RECEIVED FROM	RECEIVED AS
RAINBOW TROUT	LASSEN	5-U-Id-R4-16	McCall SFH	FRY
		5-U-Id-R4-06	Am. Falls SFH	FINGERLING
		6-U-Id-R4-16	McCall SFH	FRY
	SHASTA	6-En-R5	Ennis NFH	EGGS
	EAGLE L.	6-Ct-R6	Creston NFH	EGGS
	McCONAUGHY	6-En-R7	Ennis NFH	EGGS
BROWN TROUT	SPRING CREEK	6-U-Ut	Egan SFH	EGGS
	PLYMOUTH ROCK	6-Y-Ma	Plymouth Rock	EGGS
CUTT. TROUT	HENRYS LAKE	6-U-Id-C3	Henrys L. SFH	EGGS
		6-U-Id-C3-16	McCall SFH	FRY
COHO	COLUMBIA	6-Wd	Willard NFH	EGGS
FALL	RIVER GREAT LAKES	5-U-In-FC	Twin Branch SFH	EGGS

FISH HEALTH

Nearly every lot of fish reared here this last year experienced mortality higher than that expected when on No. 3 Clear Springs brand dry feed. This size had large, indigestible particles, which apparently caused digestive problems. We found the problem could be eased by adding vegetable oil to the feed. In 1986 to 87, we hope to avoid this problem by using another brand of feed.

A slight myxobacterial infestation in the coho in March was cleared up with three benzalkonium chloride flushes.

FISH RELEASES

Fry and Fingerling Transfers and Plants

A total of 3,547,616 fry and fingerlings weighing 52,412 lb was transferred or planted in waters in five regions of the state (Table 2).

Catchable Plants

A total of 114,578 catchable rainbow weighing 37,884 lb was planted in Region 6. The planting area included the Lost River Sinks (Birch Creek, Little Lost River drainage and the Big Lost River drainage) and the upper Salmon River tributaries from Indianola to Yankee Fork.

High Mountain Lake Program

Fifty-six high mountain lakes in Region 6 were planted with rainbow and cutthroat fry this year by U.S. Forest Service contract helicopter. The rainbow for the flights were obtained from McCall Hatchery. None of these fish have been included in our production figures, although the costs of planting were absorbed by the Mackay Hatchery budget.

FISH FEED UTILIZED

A total of 112,197 lb of fish feed were utilized at a cost of $23,188.96. A feed conversion of 1.113 was attained, and feed cost per pound of fish produced was 0.2299 cents. The two brands of dry feed used during the year were Rangens and Clear Springs brands.

HATCHERY VISITORS

Because of its remote location and severe climate, the Mackay Hatchery attracts few visitors other than fishermen, hunters and sightseers who happen here incidentally to other activities. The total number of visitors in the last year was approximately 800.

HATCHERY IMPROVEMENTS

A 900-gallon fingerling hauling tank from Mullan Hatchery was mounted on our old two-ton cab and chassis. It has been fitted with Fresh-Flo aerators and a tempering fire pump. This has relieved the bottleneck of past years when we could not haul all of our fish as quickly as they were ready. It has also improved our fire protection.

Again this year, we have added a new stack of incubators in the hatchery building, bringing our total to 210 trays. Five circular rearing tanks from the Nampa Hatchery have been added to our rectangular tanks, increasing nursery space by 20X. A sink for drying eggs and cleaning equipment has also been installed.

The old freezer room in the shop has been converted to a warm room (55^0F) for the storage of chemicals.

A fish pump obtained from Eagle Hatchery was converted for use at our quarantine pond.

In preparation for the installation of a computer in 1986 to 1987, the office and laboratory were insulated and a computer desk was built.

In the dormitory, a new cook stove and wood heating stove was installed. Linoleum, weather stripping and plastic plumbing were reglued as intermittent use is causing deterioration of the building.

MISCELLANEOUS ACTIVITIES

Again this year, Mackay Hatchery has been involved in the rainbow trout strain evaluation being conducted for Mormon, Horsethief and Lost Valley reservoirs. Rainbow trout strains raised here were Mt. Lassen, California (R4); Mt. Shasta, California (R5); Eagle Lake, California (R6); and Lake McConaughy, Nebraska (R7).

The Mt. Shasta rainbow proved the best performers in the hatchery situation, and the Lake McConaughy rainbow proved the poorest (Table 4).

Table 4. Hatchery performance of rainbow trout strains, Mackay Fish Hatchery, October 1, 1985 to September 30, 1986.

Strain (abbreviation)	Average daily length increase	Feed conversion	Survival from egg to plant
Mt. Shasta (R5)	0.023 in	1.02	71.6
Mt. Lassen (R4)	0.0225 in	1.07	78.6[a]
Eagle Lake (R7)	0.0225 in	1.38	59.8
McConaughy (R7)	0.0198 in	1.68	55.6

[a]This figure is probably unrealistic as half were planted as fry.

HATCHERY NEEDS

The Fish Culturist position removed temporarily in 1983 should be reinstated to keep us from losing our entire production should an emergency (or even employee illness) arise.

A low water alarm needs to be installed at the intake to the hatchery building. All other intakes are relatively foolproof.

A 30-in pipeline, installed in 1951, needs an assessment of its integrity and perhaps total replacement. When it is replaced, we should consider adding packed-column aerators to the headrace end of the pipe to aerate raw water now added at the intake end.

The two 4-in incubator lines in the hatchery building are rusting through and should be replaced with PVC lines. The existing valves are in good condition.

The domestic waterline is broken somewhere near its intake and continually allows sand into the pressure system. The intake is under 4 ft of water, and repair would be extremely difficult. I propose we install a sand trap at the lower end of the pipe just before the pressure pump.

Additional nursery space is needed for training fish to feed. We currently operate at 2002 of nursery space for three months of every year.

If we are to continue to raise fall chinook, a deep, wide raceway with full aeration should be built to produce a better quality product. Our present raceways are not the proper configuration for that purpose. Our quarantine raceway (10 ft x 44 ft x 40 in) would fit this purpose nicely. It could be converted by adding 250 ft of 12-in pipe, an intake structure and a packed column. This conversion would not preclude the use of this raceway for quarantine should that again become necessary. It would just change water supplies from re-use to first use, utilizing water which we now waste down the ditch.

ACKNOWLEDGEMENTS

Hatchery staffing during the 1985-86 fish year included: Bill Doerr, Fish Hatchery Superintendent II; Doug Burton and Doug Ramsey, Fish Hatchery Superintendents I (stationed here at different times); Lola Coates, Bio-Aide; and Scott Patterson, Bio-Aide.

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